

ABSTRACT

An optical imaging system including an illumination system, a Cartesian PBS, and a prism assembly. The illumination system provides a beam of light, the illumination system having an  $f/\#$  less than or equal to 2.5. The Cartesian polarizing beam-splitter has a first tilt axis, oriented to receive the beam of light. A first polarized beam of light having one polarization direction is folded by the Cartesian polarizing beam splitter and a second polarized beam of light having a second polarization direction is transmitted by the Cartesian polarizing beam splitter. The Cartesian polarizing beam splitter nominally polarizes the beam of light with respect to the Cartesian beam-splitter to yield the first polarized beam in the first polarization direction. The color separation and recombination prism is optically aligned to receive the first polarized beam. The prism has a second tilt axis, a plurality of color separating surfaces, and a plurality of exit surfaces. The second tilt axis maybe oriented perpendicularly to the first tilt axis of the Cartesian polarizing beam-splitter so that the polarized beam is nominally polarization rotated into the second polarization direction with respect to the color separating surfaces and a respective beam of colored light exits through each of the exit surfaces. Each imager is placed at one of the exit surface of the color separating and recombining prism to receive one of the respective beams of colored light, wherein each imager can separately modulate the polarization state of the beam of colored light.